

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H03M3/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H03M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | EP 0 586 021 A (ANALOG DEVICES INC) 9 March 1994 (1994-03-09) page 6, line 12 - line 57; figure 7 | 1-4, 10, 12, 13 |
| X | FERGUSON JR P F ET AL: "ONE BIT HIGHER ORDER SIGMA-DELTA A/D CONVERTERS" PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON CIRCUITS AND SYSTEMS. NEW ORLEANS, MAY 1 - 3, 1990, NEW YORK, IEEE, US, vol. VOL. 2 CONF. 23, 1 May 1990 (1990-05-01), pages 890-893, XP000166962 abstract; figures 2,5 ----- -/-- | 1-4, 10, 12, 13 |

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the International filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the International filing date but later than the priority date claimed

- *T* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the International search

21 September 2004

Date of mailing of the International search report

05/10/2004

Name and mailing address of the ISA

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | TOSHIYUKI OKAMOTO ET AL: "A STABLE HIGH-ORDER DELTA-SIGMA MODULATOR WITH AN FIR SPECTRUM DISTRIBUTOR" IEEE JOURNAL OF SOLID-STATE CIRCUITS, IEEE INC. NEW YORK, US, vol. 28, no. 7, 1 July 1993 (1993-07-01), pages 730-734, XP000322301 ISSN: 0018-9200 abstract; figure 2 | 1-4,10, 12,13 |
| X | US 5 241 310 A (TIEMANN JEROME J) 31 August 1993 (1993-08-31) figures 2,3 | 1,9 |
| X | US 2002/105449 A1 (SINGER LAWRENCE ET AL) 8 August 2002 (2002-08-08) abstract; figures 3-5 | 1,9 |
| X | SHENGPING YANG ET AL: "A tunable bandpass sigma-delta A/D conversion for mobile communication receiver" VEHICULAR TECHNOLOGY CONFERENCE, 1994 IEEE 44TH STOCKHOLM, SWEDEN 8-10 JUNE 1994, NEW YORK, NY, USA, IEEE, 8 June 1994 (1994-06-08), pages 1346-1350, XP010123297 ISBN: 0-7803-1927-3 page 1347, right-hand column - page 1348, left-hand column | 1 |

INTERNATIONAL SEARCH REPORT

national application No.
PCT/IB2004/051003

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8,10-14

sigma-delta A/D converter with filters in feedback and feedforward path, that are adapted to provide a frequency-independent transfer function for the input signal in the passband.

2. claims: 1,9

A sigma-delta A/D-converter comprising gain controlled stages in the feedback path or feedforward path.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

IB2004/051003

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
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| EP 0586021 | A | 09-03-1994 | US 5055843 A | 08-10-1991 |
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| | | | DE 69107059 D1 | 09-03-1995 |
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| | | | US 5311181 A | 10-05-1994 |
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| | | | WO 02063773 A2 | 15-08-2002 |